

## CLAIMS

1. A data transfer system, comprising
  - a plurality of devices connected in a hierarchical branching arrangement including at least one intermediate device and at least one end device connected to said intermediate device, each of said devices having a different rate for transferring data and a different delay time for sending back data depending on said transfer rate, and
  - a management apparatus for managing the transfer of said data among said devices, said management apparatus including
    - transfer rate determining means for determining a slowest transfer rate from among said transfer rates of said devices;
    - propagation time measuring means for measuring a propagation time between said management apparatus and each of said end devices by transmitting predetermined data to each of said end devices at said slowest transfer rate;
    - reciprocation time calculating means for calculating a maximum reciprocation time based on said measured propagation times, said maximum reciprocation time indicating the time in which said predetermined data is reciprocated for said end device farthest away from said management apparatus; and
    - reference value calculating means for calculating a reference value based on said maximum reciprocation time, said reference value being used to calculate a waiting time required when each said device transfers said data.
2. The data transfer system according to Claim 1, wherein said devices are connected via an IEEE 1394 high performance serial bus.
3. A data transfer management apparatus for managing the transfer of data in a data transfer system including a plurality of devices, each of the devices having a different rate for transferring the data and a different delay time for sending back data depending on the transfer rate, the devices being connected in a hierarchical branching arrangement including at least one intermediate device and at least one

end device connected to the intermediate device, said data transfer management apparatus comprising:

transfer rate determining means for determining a slowest transfer rate from among the transfer rates of the devices;

propagation time measuring means for measuring a propagation time between said data transfer management apparatus and each of the end devices by transmitting predetermined data to each of the end devices at said slowest transfer rate;

reciprocation time calculating means for calculating a maximum reciprocation time based on said measured propagation times, said maximum reciprocation time indicating the time in which said predetermined data is reciprocated for the end device farthest away from said data transfer management apparatus; and

reference value calculating means for calculating a reference value based on said maximum reciprocation time, said reference value being used to calculate a waiting time required when each device transfers the data.

4. The data transfer management apparatus according to Claim 3, wherein said data transfer management apparatus is connected to each of the devices via an IEEE 1394 high performance serial bus.

5. A method for transferring data in a data transfer system including a plurality of devices and a management apparatus for managing the transfer of data among the devices, the devices being connected in a hierarchical branching arrangement including at least one intermediate device and at least one end device connected to the intermediate device, each of the devices having a different rate for transferring the data and a different delay time for sending back data depending on the transfer rate, the devices being connected in a hierarchical branching arrangement including at least one intermediate device and at least one end device connected to the intermediate device, said data transfer method comprising:

determining a slowest transfer rate from among the transfer rates of the devices;

measuring a propagation time between the management apparatus and each of the end devices by transmitting predetermined data to each of the end devices at the slowest transfer rate;

calculating a maximum reciprocation time based on the measured propagation times, the maximum reciprocation time indicating the time in which the predetermined data is reciprocated for the end device farthest away from the management apparatus; and

calculating a reference value based on the maximum reciprocating time, the reference value being used to calculate a waiting time required when each device transfers the data.

6. The data transfer method according to Claim 5, wherein the devices are connected via an IEEE 1394 high performance serial bus.